

NAME P/N QTY	CRIT	FAILURE MODE & CAUSES	FAILURE EFFECT	RATIONALE FOR ACCEPTANCE
RESTRICTOR, ITEM 120A ----- SV785844-17 (1)	2/1R	120AFM02 Excessive gas flow. Orifice erosion, O-seal bypass leakage.	END ITEM: Primary oxygen delivery to the suit at greater than the metabolic consumption rate. GFE INTERFACE: Increase in suit pressure and venting through the positive pressure relief valve (Item 146). Depletion of primary O2 supply. MISSION: Terminate EVA. Loss of use of one EMU. CREW/VEHICLE: None for single failure. Possible loss of crewman with loss of Item 146 or SOP. TIME TO EFFECT /ACTIONS: Seconds. TIME AVAILABLE: Minutes. TIME REQUIRED: Minutes. REDUNDANCY	A. Design - The orifice (0.004 inch diameter) is made of inconel 625. Sealing is by a radial silicone "o"-ring. That provides squeeze under all loading conditions. B. Test - Component Acceptance Test - An orifice flow test is performed per AT-E-120-1. With the orifice inlet at 14.6 - 15.7 psig and the outlet at ambient, the orifice must flow 182-291 scc/min N2. PDA Test - Performance testing is run per SEMU-60-010. With the orifice inlet pressurized to 15.8 - 16.0 psig and the outlet at 0 +/- .4 psig, the orifice must flow 173-283 scc/min O2. Certification Test - Certified for a useful life of 25 years (ref EMUM-1418). C. Inspection - The interfacing surfaces between the orifice housing and the valve housing are 100% inspected for meeting dimensional and surface finish requirements. The "O"-seals are inspected for surface characteristics per SVHS3432; 100% for Classes I and II, at least a 1.5 AQL for Class III. Flow/delta P and performance tests are run as in process tests to verify the orifice assembly is working correctly (no leakage). D. Failure History - H-EMU-120-D001 (9-12-83) - The 120 valve failed the AT bleed flow test (shear plate level) due to excessive cracking and reseat flows caused by the 120A orifice housing O-ring being cut during assembly. Added a chamfer to the housing edge break and a visual examination of the O-ring after installation on the restrictor before assembly into the housing. H-EMU-120-D003 (9-23-83) - Excessive bleed flow through Item 120A due to the sealing surface finish not to blueprint. Added orifice bleed flow test to the IPT test sheets. H-EMU-120-D007 (7/31/89) - Item 120A orifice flow was slightly above spec. The orifice had passed the detail level flow test at a low differential pressure and now failed at a higher differential pressure because the same maximum flow rate was specified at both differential pressures. Since sonic orifice flow increases proportionally with increasing differential pressure, the max. allowable flowrate must increase at increasing differential pressures. EC 163402-342 changes the max. orifice flow versus differential pressure specification from a constant max flow value to an increasing max flow limit at increasing differential pressures. B-EMU-120-A009 (8/11/89) - Item 120A orifice flowed excessively. Anomaly could not be duplicated. High flow condition could have been caused by particulate contamination in the parallel 120B high or low mode relief valve seats which subsequently dislodged and returned the valve to normal operation. Contamination

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		120AFM02	SCREENS: A-PASS B-PASS C-PASS	source is the moist oxygen side of the neoprene water tank bladder cavity. (Neoprene bladders have been replaced by Fluorel bladders). E. Ground Turnaround - Tested for non-EET processing per FEMU-R-001, Item 120A Orifice Flow and Item 120B Relief Valve/Relief and Reseat Check. None for EET processing. F. Operational Use - Crew Response - PreEVA: Trouble shoot problem, if no success consider EMU 3 if available. EMU go to remain on SCU. PostEVA: N/A. EVA: When CWS data confirms loss of suit P regulation coupled with an accelerated primary O2 use rate, terminate EVA. Training - Standard EMU training covers this failure mode. Crewman are trained for one man EVA scenario. Operational Considerations - Flight rules define go/no go criteria related to EMU suit pressure regulation. Flight rules define EMU as go to remain on SCU (available for rescue if required). EVA checklist and FDF procedures verify hardware integrity and operational status prior to EVA. Real Time Data Systems allows ground monitoring of EMU systems.

EXTRAVEHICULAR MOBILITY UNIT
SYSTEMS SAFETY REVIEW PANEL REVIEW
FOR THE
I-120 DUAL MODE RELIEF VALVE
CRITICAL ITEM LIST (CIL)
EMU CONTRACT NO. NAS 9-97150

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